

CLAIMS:

1. A dielectric resonator antenna comprising a dielectric resonator having a substantially planar longitudinal surface and a grounded substrate having first and second opposed surfaces with a dielectric substrate adjacent to the second surface,
5 wherein:

i) the grounded substrate includes a slot extending longitudinally in a first direction and having a predetermined width;

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ii) the dielectric resonator is arranged such that its longitudinal surface is disposed close to the first surface of the grounded substrate with a gap between the surfaces, and with an end region of the longitudinal surface overlying the width of the slot;

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iii) a conductive layer is provided on the longitudinal surface of the dielectric resonator with a conductive layer, the end region of the longitudinal surface being free of the conductive layer; and

20 iv) a strip feed line is provided on the dielectric substrate on the second surface of the grounded substrate, the strip feed line being substantially coextensive with the longitudinal surface of the dielectric resonator and extending beyond the width of the slot in the grounded substrate.

25 2. An antenna as claimed in claim 1, wherein the antenna resonates in an EH_{118} mode during operation thereof.

3. An antenna as claimed in claim 1 or 2, wherein the dielectric resonator has a half cylindrical configuration with a rectangular basal surface thereof being the
30 longitudinal surface.

4. An antenna as claimed in claim 1 or 2, wherein the dielectric resonator is formed from a half cylindrical dielectric resonator with a rectangular basal surface thereof being the longitudinal surface and a surface opposed to the rectangular basal surface being flattened so as to form a plateau.

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5. An antenna as claimed in claim 1 or 2, wherein the dielectric resonator has an oblong configuration with a rectangular basal surface thereof being the longitudinal surface.

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6. An antenna as claimed in claim 1 or 2, wherein the dielectric resonator has a triangular prismatic configuration with a rectangular basal surface thereof being the longitudinal surface.

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7. An antenna as claimed in claim 1 or 2, wherein the dielectric resonator is formed from a triangular prismatic dielectric resonator with a rectangular basal surface thereof being the longitudinal surface and a surface opposed to the rectangular basal surface being flattened so as to form a plateau.

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8. An antenna as claimed in any preceding claim, wherein the conductive layer is a metallised paint.

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9. An antenna as claimed in any preceding claim, wherein the longitudinal surface of the dielectric resonator is adhered to the grounded substrate with an adhesive loaded with a conductive material, the adhesive defining the gap between the surfaces.

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10. A method of manufacturing a dielectric resonator antenna comprising a dielectric resonator having a substantially planar longitudinal surface and a grounded substrate having first and second opposed surfaces with a dielectric substrate adjacent to the second surface, wherein:

- i) a slot is formed in the grounded substrate, the slot extending longitudinally in a first direction and having a predetermined width;
- 5 ii) a strip feed line is provided on the dielectric substrate on the second surface of the grounded substrate, the strip feed line being generally perpendicular to the slot in the grounded substrate and having one end that extends beyond the width of the slot;
- 10 iii) a conductive layer is coated onto a majority of the longitudinal surface of the dielectric resonator, leaving an end region of the longitudinal surface free of the conductive layer;
- 15 iv) the dielectric resonator is arranged such that its longitudinal surface is disposed close to the first surface of the grounded substrate with a gap between the surfaces, and with the end region of the longitudinal surface overlying the width of the slot;
- 20 v) the dielectric resonator antenna is connected to a resonance analyser and the dielectric resonator is moved about over the first surface of the grounded substrate until a resonance position is found where a predetermined resonance mode is detected by the resonance analyser;
- 25 vi) the longitudinal surface of the dielectric resonator is adhered to the first surface of the grounded substrate in the resonance position with an adhesive laden with a conductive material; and
- vii) the end of the strip feed line extending beyond the slot in the grounded substrate is trimmed back until the predetermined resonance mode measured by the resonance analyser predominates over other possible resonance modes.

11. A method according to claim 10, wherein the predetermined resonance mode is an EH_{118} resonance mode.
12. A method according to claim 10 or 11, wherein the dielectric resonator has a half cylindrical configuration with a rectangular basal surface and a curved surface, the rectangular basal surface being the longitudinal surface.
13. A method according to claim 12, wherein the curved surface of the dielectric resonator is flattened so as to form a plateau.
14. A method according to claim 10 or 11, wherein the dielectric resonator has a triangular prismatic configuration with a rectangular basal surface and an apex opposed to rectangular basal surface, the rectangular basal surface being the longitudinal surface.
15. A method according to claim 14, wherein the apex of the dielectric resonator is flattened so as to form a plateau.
16. A method according to claim 10 or 11, wherein the dielectric resonator has an oblong configuration with a rectangular basal surface, the rectangular basal surface being the longitudinal surface.
17. A method according to any one of claims 10 to 16, wherein the conductive layer is applied as a metallised paint.
18. A method according to any one of claims 10 to 17, wherein the resonance analyser is a vector network analyser.
19. A method according to claim 12 or 14 or any claim depending therefrom, wherein the curved surface or apex of the dielectric resonator is flattened by grinding or filing so as to increase a resonant frequency of the antenna.

20. A dielectric resonator antenna comprising a dielectric resonator having a substantially planar longitudinal surface, a dielectric substrate having first and second opposed surfaces with a conductive groundplane being provided on the second surface and a direct microstrip feedline being provided on the first surface so as to extend longitudinally therealong, the dielectric resonator being mounted on the first surface such that the planar longitudinal surface of the dielectric resonator contacts the direct microstrip feedline and is coextensive therewith.
21. An antenna as claimed in claim 20, wherein the direct microstrip feedline extends beyond the longitudinal surface of the dielectric resonator along the first surface of the dielectric substrate so as to provide an overhang.
22. An antenna as claimed in claim 21, wherein the overhang curves in a plane of the dielectric substrate.
23. An antenna as claimed in claim 21, wherein the overhang is substantially straight.
24. An antenna as claimed in any one of claims 20 to 23, wherein substantially all of the longitudinal planar surface of the dielectric resonator is provided with a conductive layer.
25. An antenna as claimed in any one of claims 20 to 23, wherein only a part of the longitudinal planar surface of the dielectric resonator that contact the direct microstrip feedline is provided with a conductive layer.
26. An antenna as claimed in claims 23 or 25, wherein the conductive layer is a metallised paint.

27. An antenna as claimed in any one of claims 20 to 26, wherein the antenna resonates in an EH mode during operation thereof.

28. An array of dielectric resonator antennas as claimed in any one of claims 1 to 9 or 20 to 27 or manufactured by the method of any one of claims 10 to 19, the antennas being arranged in the array such that the longitudinal surfaces of the dielectric resonators are substantially colinear.

29. An array as claimed in claim 28, wherein the longitudinal surfaces are aligned in a direction generally perpendicular to a given terrestrial ground plane.

30. An array as claimed in claim 29, wherein the array generates a radiation pattern with vertical polarisation.